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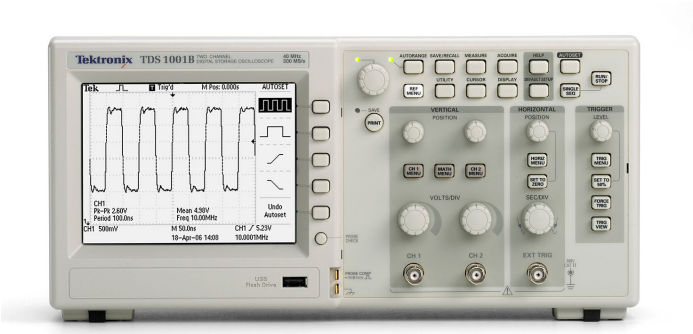
Digital Storage Oscilloscopes

TDS1000B Series Data Sheet

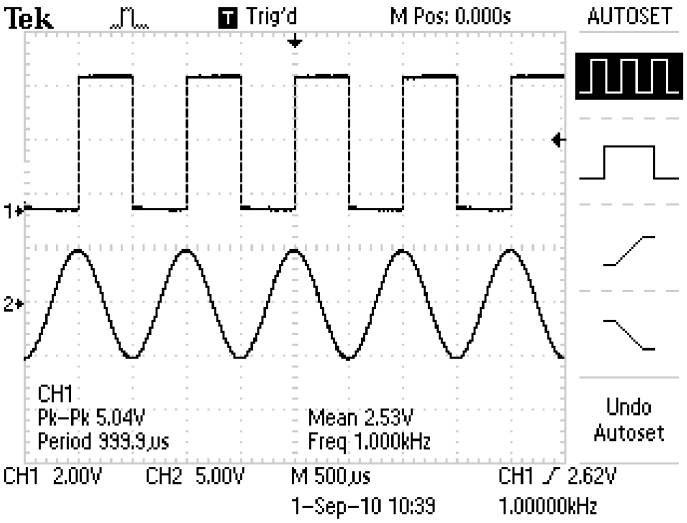


Applications

- Design and Debug
- Education and Training
- Manufacturing Test and Quality Control
- Service and Repair

Features & Benefits

- 40 MHz, 60 MHz, and 100 MHz Bandwidths
- Sample Rates up to 1 GS/s Real Time
- 2 Channels
- Monochrome LCD Display
- Removable Data Storage using the Front-panel USB Port
- Seamless PC Connectivity through the USB Device Port, with OpenChoice® and NI SignalExpress® PC Software
- Advanced Triggers including Pulse Width Trigger and Line-selectable Video Trigger
- FFT Standard on All Models
- 12 Automatic Measurements
- Multiple-language User Interface and Context-sensitive Help
- Direct Print to All PictBridge®-compatible Printers through the USB Device Port
- Lifetime Warranty*[1]



Quickly and easily capture waveforms.

TDS1000B Series Oscilloscopes

Instantly Productive. Incredibly Easy.

The TDS1000B Series digital storage oscilloscopes deliver an unbeatable combination of performance and ease of use, at a price you can afford.

Affordable Digital Precision

With up to 100 MHz bandwidth and 1 GS/s maximum sample rate, no other digital storage oscilloscope offers as much bandwidth and sample rate for the price. The TDS1000B Series oscilloscopes provide accurate real-time acquisition up to their full bandwidth, the same record length at all time base settings, advanced triggers to isolate signals of interest, and 12 standard automatic measurements on all models. Their Fast Fourier Transform (FFT) and waveform add, subtract, and multiply math functions allow you to analyze, characterize, and troubleshoot circuits.

Quick and Easy Waveform Capture

The simple user interface with classic analog-style controls makes these instruments easy to use, reducing learning time and increasing efficiency. Innovative features such as the Autoset Menu, Probe Check Wizard, and Context-sensitive Help Menu optimize instrument setup and operation.

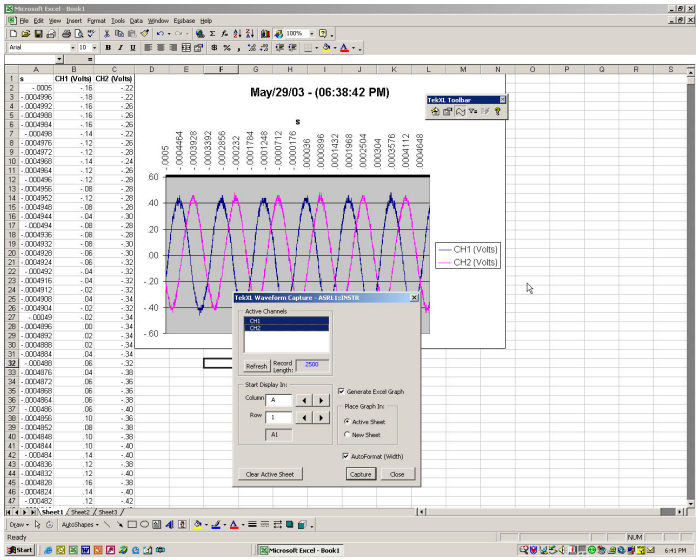
Flexible Data Transfer

With USB host and device ports which enable removable data storage, seamless PC connectivity, and direct printing, no other digital storage oscilloscope offers as much flexibility and ease of data transfer for the price.

Simple Documentation and Analysis

Easily capture, save, and analyze measurement results with OpenChoice PC Communications Software. Simply pull screen images and waveform data into the stand-alone desktop application or directly into Microsoft Word and Excel. To complement OpenChoice, National Instruments

Conveniently use your USB flash drive to store screenshots and waveform data.



Easily capture, save, and analyze measurement results with OpenChoice PC Communications Software.

SignalExpress Tektronix Edition Software provides you with extended capabilities, including advanced analysis, remote oscilloscope control, and live waveform analysis. Alternatively, if you prefer not to use the PC, you can simply print your image directly to any PictBridge-compatible printer using the USB device port.

Performance You Can Count On

Depend on Tektronix to provide you with performance you can count on. In addition to industry-leading service and support, every TDS1000B Series oscilloscope comes backed with a Lifetime Warranty*[1] as standard.

Characteristics

TDS1000B Series Digital Storage Oscilloscopes

Characteristic	TDS1001B	TDS1002B	TDS1012B
Display (1/4 VGA LCD)		Mono	
Bandwidth*2	40 MHz	60 MHz	100 MHz
Channels		2	
External Trigger Input		Included on all models	
Sample Rate on Each Channel	500 MS/s	1.0 GS/s	1.0 GS/s
Record Length		2.5K points at all time bases on all models	
Vertical Resolution		8 bits	
Vertical Sensitivity		2 mV to 5 V/div on all models with calibrated fine adjustment	
DC Vertical Accuracy		±3% on all models	
Vertical Zoom		Vertically expand or compress a live or stopped waveform	
Maximum Input Voltage		300 V_{RMS} CAT II; derated at 20 dB/decade above 100 kHz to 13 V_{p-p} AC at 3 MHz	
Position Range		2 mV to 200 mV/div +2 V; >200 mV to 5 V/div +50 V	
Bandwidth Limit		20 MHz for all models	
Input Coupling		AC, DC, GND on all models	
Input Impedance		1 MΩ in parallel with 20 pF	
Time Base Range		5 ns to 50 s/div	
Time Base Accuracy		50 ppm	
Horizontal Zoom		Horizontally expand or compress a live or stopped waveform	
I/O Interfaces			
USB Ports		USB host port on front panel supports USB flash drives USB device port on back of instrument supports connection to PC and all PictBridge-compatible printers	
GPIB		Optional	
Nonvolatile Storage			
Reference waveform display		(2) 2.5K point reference waveforms	
Waveform storage without USB flash drive		(2) 2.5K point	
Maximum USB flash drive size		64 GB	
Waveform storage with USB flash drive		96 or more reference waveforms per 8 MB	
Setups without USB flash drive		10 front-panel setups	
Setups with USB flash drive		4000 or more front-panel setups per 8 MB	
Screen images with USB flash drive		128 or more screen images per 8 MB (the number of images depends on file format selected)	
Save All with USB flash drive		12 or more Save All operations per 8 MB A single Save All operation creates 3 to 9 files (setup, image, plus one file for each displayed waveform)	

*2 Bandwidth is 20 MHz at 2 mV/div, all models.

Acquisition Modes

Mode	Description
Peak Detect	High-frequency and random-glitch capture. Captures glitches as narrow as 12 ns (typical) at all time base settings from 5 µs/div to 50 s/div
Sample	Sample data only
Average	Waveform averaged, selectable: 4, 16, 64, 128
Single Sequence	Use the Single Sequence button to capture a single triggered acquisition sequence
Roll	At acquisition time base settings of >100 ms/div

Trigger System

Characteristic	Description
Trigger Modes	Auto, Normal, Single Sequence

Trigger Types

Trigger	Description
Edge (Rising/Falling)	Conventional level-driven trigger. Positive or negative slope on any channel. Coupling selections: AC, DC, Noise Reject, HF Reject, LF Reject
Video	Trigger on all lines or individual lines, odd/even or all fields from composite video, or broadcast standards (NTSC, PAL, SECAM)
Pulse Width (or Glitch)	Trigger on a pulse width less than, greater than, equal to, or not equal to, a selectable time limit ranging from 33 ns to 10 s

Trigger Source

CH1, CH2, Ext, Ext/5, AC Line.

Trigger View

Displays trigger signal while Trigger View button is depressed.

Trigger Signal Frequency Readout

Provides a frequency readout of the trigger source.

Cursors

Characteristic	Description
Types	Amplitude, Time
Measurements	ΔT, 1/ΔT, ΔV

Automatic Waveform Measurements

Period, Frequency, +Width, –Width, Rise Time, Fall Time, Max, Min, Peak-to-Peak, Mean, RMS, Cycle RMS.

Waveform Math

Characteristic	Description
Operators	Add, Subtract, Multiply, FFT
FFT	Windows: Hanning, Flat Top, Rectangular; 2048 sample points
Sources	CH1 – CH2, CH2 – CH1, CH1 + CH2, CH1 × CH2

Autoset Menu

Single-button, automatic setup of all channels for vertical, horizontal, and trigger systems, with undo Autoset.

Signal Type	Autoset Menu Choices
Square Wave	Single Cycle, Multicycle, Rising or Falling Edge
Sine Wave	Single Cycle, Multicycle, FFT Spectrum
Video (NTSC, PAL, SECAM)	Field: All, Odd, or Even Line: All or Selectable Line Number

Autorange

Automatically adjust vertical and/or horizontal oscilloscope settings when probe is moved from point to point, or when the signal exhibits large changes.

Display Characteristics

Characteristic	Description
Display	¼ VGA backlit passive LCD with adjustable multilevel contrast and inverse video selectable from front panel
Interpolation	Sin (x)/x
Display Types	Dots, vectors
Persistence	Off, 1 s, 2 s, 5 s, infinite
Format	YT and XY

Multiple-language User Interface and Context-sensitive Help

Characteristic	Description
Languages Available	English, French, German, Italian, Japanese, Korean, Portuguese, Russian*3, Simplified Chinese, Spanish, Traditional Chinese

*3 Requires Russian firmware, indicated by "RUS" suffix.

Environmental and Safety

Characteristic	Description
Temperature	
Operating	0 to +50 ºC
Nonoperating	–40 to +71 ºC
Humidity	
Operating and Nonoperating	Up to 80% RH at or below +40 ºC
Operating and Nonoperating	Up to 45% RH up to +50 ºC
Altitude	
Operating and Nonoperating	Up to 3,000 m
Electromagnetic Compatibility	Meets Directive 2004/108/EC, EN 61326-2-1 Class A; Australian EMC Framework
Safety	UL61010-1:2004, CSA22.2 No. 61010-1:2004, EN61010-1:2001, IEC61010-1:2001

Physical Characteristics

Instrument

Dimensions	mm	in.
Width	326.3	12.85
Height	158.0	6.22
Depth	124.2	4.89
Weight	**kg**	**lb.**
Instrument Only	2.0	4.4
With accessories	2.2	4.9

Instrument Shipping

Package Dimensions	mm	in.
Width	476.2	18.75
Height	266.7	10.5
Depth	228.6	9.0
RM2000B Rackmount	**mm**	**in.**
Width	482.6	19.0
Height	177.8	7.0
Depth	108.0	4.25

Ordering Information

Models

Model	Description
TDS1001B	40 MHz, 2 Ch, 500 MS/s, Monochrome DSO
TDS1002B	60 MHz, 2 Ch, 1 GS/s, Monochrome DSO
TDS1012B	100 MHz, 2 Ch, 1 GS/s, Monochrome DSO

Standard Accessories

Accessory	Description
Passive Probes	200 MHz (one per channel)
Power Cord	(Please specify plug option)
NIM/NIST	Traceable Certificate of Calibration
Documentation	User manual (please specify preferred language option)
OpenChoice PC Communications Software	Enables fast and easy communication between a Windows PC and the TDS1000B Series using USB. Transfer and save settings, waveforms, measurements, and screen images
National Instruments SignalExpress Tektronix Edition Interactive Measurement Software – Base Version	A fully interactive measurement software environment optimized for the TDS1000B Series. Enables you to instantly acquire, generate, analyze, compare, import, and save measurement data and signals using intuitive drag-and-drop user interface that does not require any programming. Standard TDS1000B Series support for acquiring, controlling, viewing, and exporting your live signal. A 30-day trial period of the Professional Version provides additional signal processing, advance analysis, mixed signal, sweeping, limit testing, and user-defined step capabilities. Order SIGEXPTE for permanent Professional Version capability
Limited Lifetime Warranty*4	Covers labor and parts for defects in materials and workmanship for a minimum of 10 years, excluding probes and accessories*5

*4 Lifetime is defined as 5 years after Tektronix discontinues manufacturing the product, but the warranty length shall be at least 10 years from date of original purchase. Lifetime warranty is nontransferable, proof of original purchase is required. Limitations apply. For terms and conditions visit www.tektronix.com/lifetimewarranty.

*5 Probes and accessories are not covered by the oscilloscope warranty and service offerings. Refer to the data sheet of each probe and accessory model for its unique warranty and calibration terms.

Power Plug Options

Option	Description
A0	North America power
A1	Universal Euro power
A2	United Kingdom power
A3	Australia power
A5	Switzerland power
A6	Japan power
A10	China power
A11	India power
A99	No power cord or AC adapter

User Manual Options

Translated front-panel overlays included with their respective user manuals.

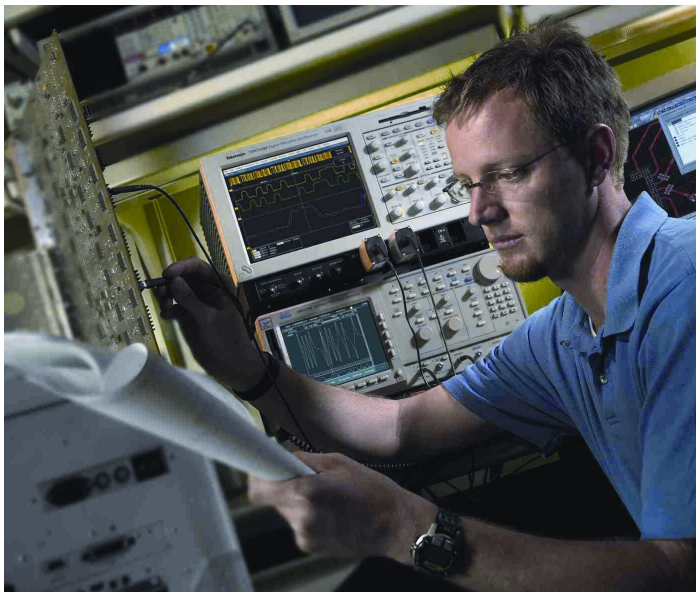
Option	Description
L0	English manual
L1	French manual
L2	Italian manual
L3	German manual
L4	Spanish manual
L5	Japanese manual
L6	Portuguese manual
L7	Simple Chinese manual
L8	Standard Chinese manual
L9	Korean manual
L10	Russian manual

Recommended Accessories

Accessory	Description
TEK-USB-488	GPIB-to-USB Converter
SIGEXPTE	National Instruments SignalExpress Tektronix Edition Interactive Measurement Software – Professional Version
AC2100	Soft Carrying Case for instrument
HCTEK4321	Hard Plastic Carrying Case for instrument (requires AC2100)
RM2000B	Rackmount Kit
071-1075-xx	Programmer's Manual – English Only
071-1828-xx	Service Manual – English Only
174-4401-xx	USB Host-to-Device Cable, 3 ft. long

Recommended Probes

Probe	Description
P2220	10X to 1X Switchable Passive probe (200 MHz when 10X is selected)
P6101B	1X Passive probe (15 MHz, 300 V_{RMS} CAT II rating)
P6015A	1000X High-voltage Passive probe (75 MHz)
P5100	100X High-voltage Passive probe (250 MHz)
P5200	High-voltage Active Differential probe (25 MHz)
P6021	15 A, 60 MHz AC Current probe
P6022	6 A, 120 MHz AC Current probe
A621	2000 A, 5 to 50 kHz AC Current probe
A622	100 A, 100 kHz AC/DC Current probe/BNC
TCP303/TCPA300	150 A, 15 MHz AC/DC Current probe/amplifier
TCP305/TCPA300	50 A, 50 MHz AC/DC Current probe/amplifier
TCP312/TCPA300	30 A, 100 MHz AC/DC Current probe/amplifier
TCP404XL/TCPA400	500 A, 2 MHz AC/DC Current probe/amplifier



Service Options*[5]

Option	Description
C3	Calibration Service 3 Years
C5	Calibration Service 5 Years
D1	Calibration Data Report
D3	Calibration Data Report 3 Years (with Option C3)
D5	Calibration Data Report 5 Years (with Option C5)
CA1	Provides a single calibration event or coverage for the designated calibration interval, whichever comes first

*[5] Probes and accessories are not covered by the oscilloscope warranty and service offerings. Refer to the data sheet of each probe and accessory model for its unique warranty and calibration terms.

Service Offerings (Available after purchase)

Option	Description
TDSxxxxB-CA1	Provides a single calibration event or coverage for the designated calibration interval, whichever comes first

The Complete Measurement Solution

The AFG3000 Series arbitrary function generator pairs with the TDS1000B Series digital storage oscilloscopes to deliver the two elements of a complete measurement solution – stimulus and acquisition. This instrument combines the capabilities of a function generator with the power of an arbitrary waveform generator, offering the performance needed to accurately verify, validate, and characterize designs with ease and confidence at a price you can afford.

The Tektronix Customer Service Advantage

You can trust Tektronix to offer unequalled engineering expertise and a customer-centric approach to ensure the optimal performance of your Tektronix products and maximize the lifetime value of your Tektronix investment. With service from Tektronix you get:

- Access to the source of product knowledge; unsurpassed technical expertise
- Your challenges solved by front-line technical experts, design engineering reinforcement, and online support tools
- Comprehensive and thorough support provided worldwide, including software and firmware updates, data reports, and adjustments
- Efficiency and convenience; no-hassle service from initial service call to turnaround and delivery
- Flexible repair and calibration service with access to the best on-call technical troubleshooting staff in the industry, with over 20 years of training per support engineer
- Customer-centric approach dedicated to serving your needs everyday with services designed to optimize your product performance, increase productivity and ROI by delivering a fixed cost of ownership, and efficient management of service

Get checked by Tektronix. Visit www.tektronix.com/serviceandsupport.

CE

ISO 9001 Product(s) are manufactured in ISO registered facilities.

GPIB IEEE-488 Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.